FORM NO. 51-4C
MAR 1952

(20)

50X1-HUM

CLASSIFICATION CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

COUNTRY USSR

SUBJECT Economic; Technological - Tractor industry

HOW PUBLISHED Monthly periodicals

WHERE PUBLISHED Moscow

DATE PUBLISHED Oct 1952, May 1953

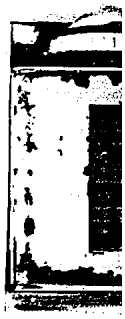
LANGUAGE Russian

DATE OF INFORMATION 1952-1953

DATE DIST. 15 Feb 1954

NO. OF PAGES 8

SUPPLEMENT TO REPORT NO.



THIS IS UNEVALUATED INFORMATION

SOURCE As indicated

SPECIFICATIONS OF SOVIET BELARUS' TRACTOR

/The bulk of the information in this report is taken from an article by I. I. Drong, a Stalin Prize winner of the Minsk Tractor Plant, in Avtomobil'naya i Traktornaya Promyshlennost', No 10, 1952. Some additional information and variant data from Mashinno-Traktornaya Stantsiya, No 5, 1953, is given, as indicated.

Figures referred to in the text are appended. 50X1-HUM

The 37-horsepower Belarus' tractor developed by the Minsk Tractor Plant comes in two models: the MTZ-1, with a narrow front tread; and the MTZ-2, with a wide front tread. The MTZ-1 is intended for cultivating tall crops (cotton, sunflower, and corn), while the MTZ-2 is designed for cultivating low-growing crops (sugar beet, potatoes, and kok-sagyz). Both models can be used with either mounted or pull-type implements; and the MTZ-2 can be used as a prime mover in transport work. Both models come equipped with low-pressure balloon tires, but can also be supplied with steel-spur rims on the rear wheels. The kinematic diagram of the Belarus' tractor is shown in Figure 1.

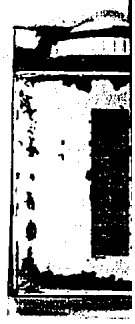
Specifications of the Belarus' tractor are as follows /variant figures, marked by an asterisk (*), in the following table are from the Mashinno-Traktornaya Stantsiya article/:

Specifications	
Type tractor	Universal, medium power plowing tractor
Type engine	Four-cycle, four-cylinder solid injection Kirovets D-35 diesel
Horsepower of engine	37

50X1-HUM

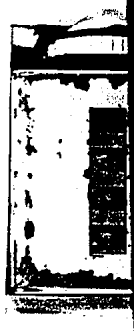
CLASSIFICATION CONFIDENTIAL

STATE	NAVY	NSRB	DISTRIBUTION
ARMY	AIR	FBI	



Specific consumption of fuel, in grams/ brake hp/ hr, maximum	220			
Tractive power on stubble field, in second gear, at rated power of engine, in hp:				
With balloon tires	22-24			
With steel-spur rims	18			
Calculated speeds (discounting slipping) at rated rpm, in km/hr; and corresponding tractive power at maximum hp in kg:				
	Speed		Tractive Power	
First gear	4.60	4.56*	1,400	
Second gear	5.65	5.61*	1,200	1,250*
Third gear	6.04	6.44*	1,100	
Fourth gear	6.93	7.38*	900	
Fifth gear	12.20	12.95*	450	
Reverse gear	3.31	3.42*		
Over-all dimensions, in mm:	MTZ-1		MTZ-2	
Length	3,720	3,678*	3,665	3,678*
Width	1,885	1,884*	1,885	1,884*
Height				
To top of radiator	1,615		1,630	
To top of exhaust pipe	2,400	2,430*	2,400	2,430*
Tread widths (adjustable), in mm:				
Rear wheels	1,250; 1,350; 1,450 [MTZ-1 front wheels]			
	220 [single front wheel]			
Front wheels	1,550; 1,650; 1,800 [MTZ-2 front wheels]			
	1,250 - 1,850 [rear wheels]			

[Note: Text later indicates that the rear wheel tread can be adjusted from 1,250 to 1,850 millimeters; hence, the tread widths as given above have apparently been transposed. A suggested interpretation of these figures is given in the brackets on the right above. (It may be noted, however, that according to Mashinno-Traktornaya Stantsiya, the front and rear wheels of the MTZ-2 can be adjusted for tread widths from 1,200 to 1,800 mm. Turning radius is 3.7 meters. Fuel tank holds 105 liters.)]



	MTZ-1	Both	MTZ-2
Wheel sizes, in inches:			
Rear		11 x 38	
Front		5.5 x 16	
Road clearance, in mm:			
Rear axle	630		630
Front axle	-		525
Transmission housing	455	440*	455
Dry weight of tractor with hydraulic system (without drive pulley), with load on rear wheels, in kg:	3,100	3,250*	3,200

(Note: Rear wheels can be fitted with 8.25 x 40 tires when space between rows is small. Rear tires can be filled with up to 250 kilograms of water to improve traction.)

To reduce the weight on the front wheels of the tractor, the cast-iron oil pan of the D-35 engine has been replaced with a stamped steel oil pan.

The coarse and fine oil filters are based on the oil filters of the DT-54 tractor. The coarse filter is metallic; the fine filter is an ASFA-1 cardboard filter.

The oil radiator [same as that used on the DT-54 tractor, according to Mashinno-Traktornaya Stantsiya] is in front of the water radiator.

The single-disk dry clutch is unified with the clutch of the KD-35 crawler tractor, but is of the constant-mesh type. It has a central pressure spring and a special brake for slowing down the assembly when the clutch is engaged.

The five-speed transmission differs from conventional transmissions in that there is no direct drive when the main drive gear and the main shaft coincide. This arrangement makes for greater strength and hence longer life for transmission parts.

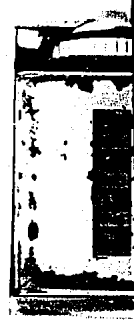
The transmission countershaft gear has smooth, ground holes in the hub, and is fitted to the smoothly ground countershaft. This arrangement reduces to a minimum the amount of play in the gears mounted on the countershaft.

The gears on the countershaft are connected to one another by protrusions and corresponding depressions on the hubs. Sliding gears are mounted on case-hardened and tempered splines of the transmission main shaft and centered on the inside diameter to minimize play and lengthen the life of splined connections.

The transmission shafts rest on ball and roller bearings mounted in the transmission housing. The one-piece iron housing is cast integrally with the differential and final drive housing.

The final drives of the tractor are two pairs of cylindrical gears.

The hubs of the side-transmission driven gears are mounted on the splined ends of the axle shafts. The axle shafts rest on two bearings mounted in special cast iron sleeves. The hubs of the rear driving wheels are mounted on



the ends of th axle shafts which project from the cast iron sleeves. The wheel hub can be moved along the splined axle shaft, so that the tread of the rear wheels can be set at any width from 1,250 to 1,850 millimeters.

The power take-off shaft is turned by the transmission countershaft, through a sliding sleeve with teeth on the inside. Figures 2 and 3 show the side and top views of the transmission.

The dry shoe brakes (Figure 4) are located outside the transmission housing, in the rear of the tractor, under the fuel tank. The brakes have independent control. There is a pedal for each brake under the driver's right foot. The two pedals can also be locked, so that pressing either pedal will operate both right and left brakes.

There is a mechanism in the transmission for locking the differential. Locking is accomplished by joining the right and left brake shafts with a sliding sleeve. The sliding sleeve of the locking mechanism is operated by a lever located in front of the driver's seat.

The steering mechanism is the same type as that of the ZIS-5 /GAZ-51, according to the Mashinno-Traktornaya Stantsiya article/ truck and is displaced to the right of the tractor's central axis. Consequently, the driver sits over the right fender, which assures him of better visibility.

Three /experimental/ models of the tractor have undergone state tests with the following mounted implements, especially designed for the Belarus' tractor: the PN-3-35 three-bottom plow, the KRN-2.5 shallow cultivator, the SNM-6 sugar-beet puller, and the KPN-4A summer fallow cultivator. For between-row cultivation of sugar beets, the tractor was tested with the KRS-5.4 trailer cultivator. During the sugar-beet harvesting season, the Belarus' was tested with the SKEM-3 three-row sugar-beet combine.

The following table compares the productivity and fuel consumption of the Belarus' tractor with those of the KDP-35 and KD-35 crawler tractors under the same working conditions.

Location of Test	Type of Work	MTZ-1 and MTZ-2 Productivity (ha per hr)	MTZ-1 and MTZ-2 Fuel Consumption (kg per ha)	KDP-35 and KD-35 Productivity (ha per hr)	KDP-35 and KD-35 Fuel Consumption (kg per ha)
Central Asia Machine Experimental Station	Stubble plowing, 18-20 cm deep	0.53	12.7	0.51-0.55	11.9-12.3
Northern Caucasus	Stubble plowing, 18-20 cm deep, and harrowing	0.41	12.6	0.5	12.8-3.8 /13.8?/ (The KD-35 tractor plowed without harrowing.)
Central Chernozem Machine Experimental Station	Cultivating	1.9-2.0	3.7-3.5	1.7	4.0

The tests showed that in plowing soils with average specific resistance (0.45-0.65 kilogram per square centimeter), the Belarus' has satisfactory productivity and fuel consumption indexes. In plowing soils with high specific resistance (0.7-0.9 kilogram per square centimeter) in Georgia and Central Asia, the tractor showed low productivity and high fuel consumption. It is obviously uneconomical to use the Belarus' as a plowing tractor under such conditions. The tractor was highly productive and showed low fuel consumption in cultivating operations and in harvesting sugar beets.

Over a long period of field testing, the three experimental models showed completely satisfactory operating qualities in the following respects: (a) The tractor's speeds in various gears correspond to the agrotechnical requirements of the Ministry of Agriculture USSR. (b) The tractor operates at between 80 and 92 percent [text has .80-.92] of full capacity with the mounted and trailer implements designed for it. (c) Coefficient of reliability in 2,000 hours of operation was 0.90-0.95. (d) Steering and handling are good, and the tractor plows sufficiently straight rows.

After prolonged field testing of the three experimental models, the State Commission concluded that the Belarus' tractor meets agricultural requirements for dynamic and economic indexes, and also for reliability in operation.

[Appended figures follow]

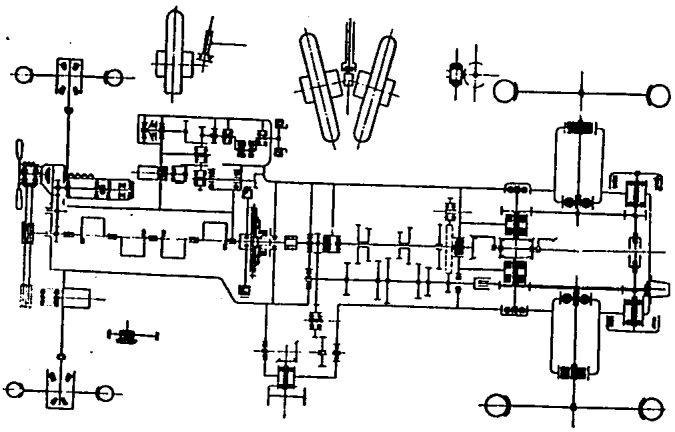


Figure 1. Kinematic Diagram of the Belarus' Tractor

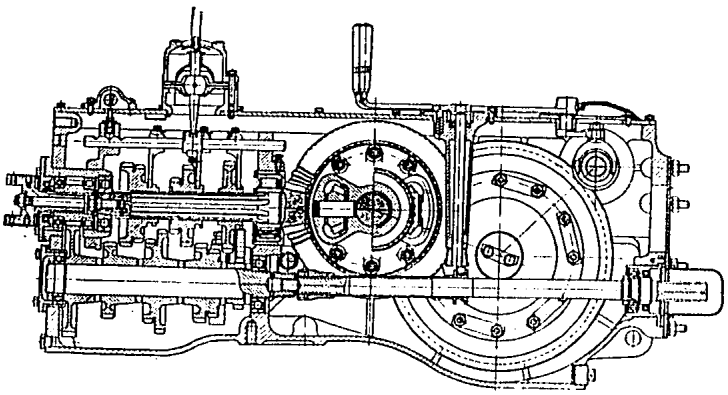


Figure 2. Side View of the Belarus' Transmission

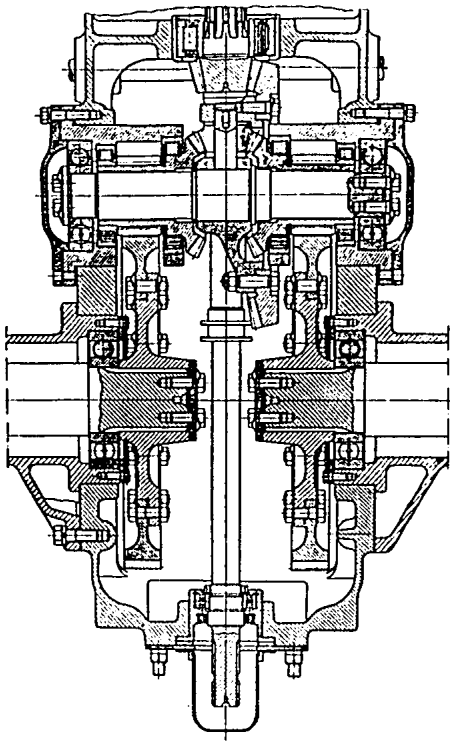


Figure 3. Top View of the Belarus' Transmission

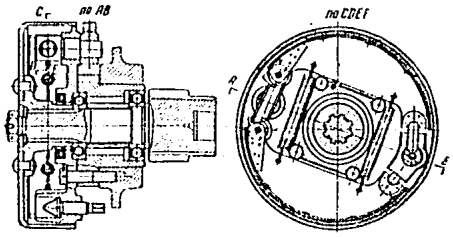


Figure 4. Brakes of the Belarus' Tractor. Figure shows cross sections from front and side of tractor

50X1-HUM